

## REMARKS

Applicants appreciate the detailed examination evidenced by the Office Action mailed January 9, 2004 ("Office Action"). Applicants further appreciate the indication that Claim 8,9, 27 and 28 recite patentable subject matter. Applicants have amended the specification to correct minor typographic errors. In response to the rejections of Claims 1-7, 10-26, and 29-44, Applicants have amended several of the claims to highlight patentable distinctions between the claims and the cited references. In particular, Applicants have amended Claims 1 and 36 to recite first and second detector signals corresponding to respective *forward* fundamental and *reflected* harmonic components of a power amplifier output signal, have amended Claim 4 to independent form incorporating recitations of Claims 1, 5 and 6, have rewritten Claim 8 to independent form incorporating recitations from Claims 1, 4 and 7, have amended Claim 17 to recite "a control circuit . . . that controls a *DC bias of the power amplifier* responsive to a comparison of the first and second detector signals," have amended Claim 20 to independent form incorporating recitations from Claims 17 and 19, and have canceled Claims 5-7, 10-12, 14, 15, 19, 22, 40 and 41. Reasons supporting patentability of the claims as amended are discussed in detail below.

### **Independent Claims 1 and 36 are patentable**

Claim 1 has been amended to recite:

An apparatus for monitoring a power amplifier coupled to a transmission medium, the apparatus comprising:

a detector circuit, coupled to the transmission medium, that generates first and second detector signals corresponding to *forward* fundamental and *reflected* harmonic components, respectively, of a power amplifier output signal produced by the power amplifier; and

a comparing circuit, coupled to the detector circuit, that compares the first and second detector signals.

Similarly, Claim 36 has been amended to recite:

A method, comprising:

generating first and second detector signals corresponding to respective *forward* fundamental and *reflected* harmonic components of a power amplifier output signal produced in a transmission medium by a power amplifier; and

comparing the first and second detector signals to determine linearity of the power amplifier.

The Office Action concedes that Katz does not disclose that "the first detector signal represents the forward power and the second detector signal represents the reflected power" (Office Action, p. 5), and Applicants further submit that Katz also does not disclose or suggest "first and second detector signals corresponding to *forward* fundamental and *reflected* harmonic components, respectively, of a power amplifier output signal produced by the power amplifier," as recited in amended Claim 1, or similar recitations of amended Claim 36. Although the Office Action asserts that U.S. Patent No. 5,196,808 to Pickett et al. ("Pickett") "discloses a first detector signal represents a forward power and a second detector signal represents a reflected power (fig. 1, column 3 lines 58-59)" (Office Action, p. 5), this passage from Pickett indicates that a first detector 34 provides a forward voltage (VFWD) and a second detector 36 provides reflective voltage (VRFL), but does not disclose or suggest that these signals represent forward *fundamental* and reflected *harmonic* components. Accordingly, the cited references, alone or in combination, do not disclose or suggest all of the recitations of amended Claim 36.

Moreover, the Office Action's stated grounds for combining Katz and Pickett to produce the recitations of Claims 14, 15, 40 and 41 does not provide the evidence from the prior art needed to support a combination of references under § 103. In particular, the Office Action states that it would have been obvious to combine these references "to detect a malfunction of the type of signal and turning off the power amplifier in order to prevent damage to a circuit board." Office Action, p. 5. However, this purpose appears to be completely irrelevant to the subject matter described in Katz, which deals with a technique for controlling a predistortion circuit or linearizer, not with how to prevent overload of a power amplifier. See Katz, Abstract. For at least the foregoing reasons, Applicant submits that amended Claims 1 and 36 are patentable.

#### **Independent Claim 4 is patentable**

Applicants have amended Claim 4 to incorporate recitations from Claims 1, 5 and 6, which all stand rejected under 25 U.S.C. § 102 as being anticipated by U.S. Patent No. 4,882,547 to Katz ("Katz"). As amended, Claim 4 recites:

An apparatus for monitoring a power amplifier coupled to a transmission medium, the apparatus comprising:

- a detector circuit, coupled to the transmission medium, that generates first and second detector signals corresponding to fundamental and harmonic components, respectively, of a power amplifier output signal produced by the power amplifier, wherein the detector circuit comprises:

- a directional coupler that couples the power amplifier to the antenna and that generates an output signal responsive to the power amplifier output signal;

- a power detector, coupled to the directional coupler, that generates the first detector signal from the output signal generated by the directional coupler;

- a capacitor shunt circuit, coupled to the transmission medium;

- a filter, capacitively coupled to the transmission medium by the capacitor shunt circuit, that filters the power amplifier output signal to produce a filtered output signal;

- a power detector, coupled to the filter, that generates the second detector signal from the filtered output signal; and

- a comparing circuit, coupled to the detector circuit, that compares the first and second detector signals.

Exemplary embodiments of such recitations are illustrated, for example, in Fig. 2 of the present application.

Katz fails to disclose or suggest all of the recitations of amended Claim 4, including, among other things, "a capacitor shunt circuit, coupled to the transmission medium" and "a filter, capacitively coupled to the transmission medium by the capacitor shunt circuit, that filters the power amplifier output signal to produce a filtered output signal." In particular, FIG. 2a of Katz clearly shows the use of two directional couplers 50 and 51 to capture a fundamental and a second harmonic, respectively, rather than the use of a directional coupler and a capacitor shunt circuit to capture such components. Moreover, although FIG. 3a of Katz, cited as teaching the "capacitive coupling" of Claim 6, shows a capacitor 90 that is coupled between an output terminal of a diode detector 80 and a signal ground, the capacitor 90 does not appear to be a "capacitor shunt circuit," and does not appear to couple a filter "to the transmission medium." For at least these reasons, Katz does not disclose or suggest the recitations of amended Claim 4. Accordingly, Applicants submit that amended Claim 4 is patentable.

**Independent Claim 8 is patentable**

Claim 8 was indicated as being allowable if rewritten to independent form incorporating the recitations of base and intervening claims. Office Action, p. 6. Applicants have rewritten Claim 8 to incorporate the recitations of Claims 1, 4 and 7 from which it originally depended. Accordingly, Applicants submit that Claim 8 is now in condition for allowance.

**Independent Claim 17 is patentable**

Claim 17 has been amended to include some of the recitations of Claim 19 (rejected as anticipated by Katz), and now recites:

An apparatus, comprising:  
    an antenna;  
    a power amplifier that generates a power amplifier output signal in a transmission medium coupling the power amplifier to the antenna;  
    a detector circuit, coupled to the transmission medium, that generates first and second detector signals corresponding to fundamental and harmonic components, respectively, of the power amplifier output signal; and  
    a control circuit, coupled to the detector circuit and operatively associated with the power amplifier, that *controls a DC bias of the power amplifier responsive to a comparison of the first and second detector signals.*

Such recitations are neither disclosed nor suggested by Katz. In particular, the passage from Katz cited in the Office Action as teaching controlling a DC bias of the power amplifier (Katz, column 7, lines 8-13; see Office Action, p. 4) refers to adjustment of a diode bias voltage of a linearizer 12 of FIG. 1, not the power amplifier 14 of FIG. 1. Accordingly, Katz does not disclose or suggest all of the recitations of amended Claim 17 and, for at least these reasons, Applicants submit that amended Claim 17 is patentable.

**Independent Claim 20 is patentable**

Applicants have amended Claim 20, which stands rejected under 35 U.S.C. § 103 as unpatentable over Katz, to independent form, incorporating the recitations of Claim 17. As amended, Claim 20 recites:

An apparatus, comprising:  
    an antenna;  
    a power amplifier that generates a power amplifier output signal in a transmission medium coupling the power amplifier to the antenna;

a detector circuit, coupled to the transmission medium, that generates first and second detector signals corresponding to fundamental and harmonic components, respectively, of the power amplifier output signal; and

a control circuit, coupled to the detector circuit and operatively associated with the power amplifier, that controls the power amplifier responsive to a comparison of the first and second detector signals, wherein the control circuit comprises:

a baseband processor that generates a data signal; and

a modulator, coupled to the baseband processor, that receives the data signal and modulates the received data signal to generate the input signal such that the level of the input signal varies responsive to a level control signal applied to the modulator,

wherein the power amplifier receives the input signal and generates the power amplifier output signal therefrom, and wherein the baseband processor is responsive to the detector circuit to generate the level control signal applied to the modulator responsive to a comparison of the first and second detector signals.

Katz does not disclose or suggest several of the recitations of amended Claim 20. For example, the passage from Katz (column 3, line 10) cited as teaching a "processor" refers to a processor that produces a control signal for a linearizer, not a modulator. The passage from Katz (column 1, lines 24-27) cited as teaching "a modulator" (see Office Action, p. 4) merely states that "[O]rdinarily, a communications channel including active devices that modulate the signal, demodulate the signal, amplify, and otherwise translate (process) the signals." Nothing in this passage teaches or suggests the operations of a baseband processor and modulator as recited in Claim 20. Moreover, contrary to the assertions of the Office Action on page 5, it would not have been obvious that the processor described in column 3, lines 6-14 is a "baseband processor," as there is no indication in Katz that this processor has any baseband functions. For at least these reasons, Applicants submit that Claim 20, as amended, is patentable.

#### **The dependent claims are patentable**

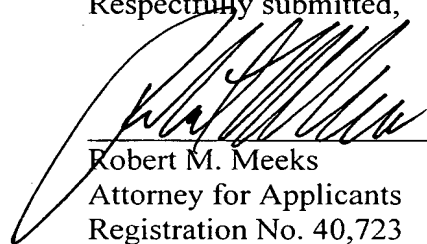
Applicants submit that the dependent claims are patentable at least by virtue of depending from various ones of patentable independent Claims 1, 8, 17, 20 and 36. Applicants further submit that several of the dependent claims are separately patentable. For example, Applicants submit that Claims 28-30 are patentable for at least similar reasons to those discussed above with reference to Claims 1 and 36, and

that Claims 26 and 27 are patentable for at least similar reasons supporting the patentability of Claims 8 and 9.

### CONCLUSION

Applicants submit that the claims are now in condition for allowance for at least the reasons described above. Accordingly, Applicants respectfully request allowance of the claims and passing of the application to issue in due course. If any informal matters arise, the Examiner is encouraged to contact the undersigned by telephone at (919) 854-1400.

Respectfully submitted,



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